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ABSTRACT

A study investigated the effectiveness of training students in think-aloud procedure to improve reading comprehension. Subjects were two groups of Taiwanese university students of English as a Foreign Language (EFL). In the first week, a think-aloud training session was given to one group. Then both groups were asked to read an English passage and take a comprehension test. In the second week, the second group was given initial think-aloud training and the first group was given additional training. Both groups read a new passage and took a comprehension test. Finally, both groups were administered a questionnaire about use of the think-aloud protocol. Results showed no significant difference between the groups but did show significant differences in the mean scores of the first and second tests. Possible explanations are considered. Questionnaire responses revealed factors that could affect student comfort level with the think-aloud procedures (length of training, text difficulty). It is concluded that while these results are not conclusive, the procedure can be used as a means of fostering text awareness and comprehension. Contains 32 references and the survey instrument. (MSE)

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The Use of Think-Aloud Procedure for EFL Instruction

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RUNNING HEAD: THINK-ALOUD

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Abstract

This paper reports the implementation results of using think-aloud procedure to improve L2 students' reading comprehension. The study involved two groups of university EFL students in Taiwan. The first week, a think-aloud training session was given to one group of students. After the training, both groups were asked to read an English passage and take a comprehension test. The second week, the other group was also given think-aloud training. Again, both groups read a new passage and took a comprehension test. Finally, both groups responded to a questionnaire to give comments on the use of the think-aloud procedure. Statistical analyses were performed on the first and second test scores of both groups. Responses to the questionnaire were also analyzed.

No significant difference between the two groups was found but significant differences between the mean scores of the first and second reading comprehension tests were found. The responses to the questionnaire were in congruence with the quantitative data. In conclusion, although certain considerations are needed while implementing the procedure, the think-aloud procedure has improved the reading comprehension of both groups and seems to be a viable approach to enhance the reading comprehension of Taiwanese EFL students.

The Use of Think-Aloud Procedure for EFL Instruction

University students in Taiwan usually face heavy reading loads in English because of the use of textbooks written in English. However, problems arise when students face demanding reading tasks but without effective strategies to resort to. Frustrated by their incapability to cope with the situation, many students find themselves on the verge of giving up reading anything in English (Chern, 1993). Improving students English reading ability, thus has been set as the primary objective of most Freshman English Programs in Taiwan (Lu, 1976; Tsai, 1979; Tse; 1985). To ease students' English reading anxiety and improve students' reading proficiency, English as a Foreign Language (EFL) educators in Taiwan are searching for new approaches to use in their classrooms (Chern, 1993; Chern & Chi, 1989; Yang, 1985). As a Freshman English teacher, the researcher has introduced the think-aloud procedure to the students with an attempt to facilitate their reading comprehension. This paper reports the implementation results of the procedure.

Developed by Newell and Simon (1972), think-aloud procedure was first used as a research tool to study cognitive problem-solving activities in experimental psychology. It has also been used in descriptive research on writing processes (Afflerbach, Bass, Hoo, Smith, Weiss, & Williams, 1988; Hayes & Flower, 1980, 1983), reading processes, and reading strategies (Fehrenbach, 1991; Olsen, Duffy, & Mack, 1984). While controversy existed as to whether the think-aloud procedure was an appropriate method to study the covert mental activities involved in learning (Afflerbach & Johnston, 1984), think-alouds have moved from the realm of data collection into instruction (Beriter & Bird, 1985; Fawcett, 1993). Think-aloud is being used as an instructional tool for teaching problem-

solving strategies (Hayes, 1981), composition (Seardamalia, Bereiter, & Steinbach, 1984), and reading (Palinscar & Brown, 1984).

Because of the increasing use of think-alouds in classrooms, the effectiveness of such an approach as a means to enhance reading comprehension in first language (L1) has garnered reading researchers' attention in recent years. Thurmond (1986) used think-alouds to teach verbal reasoning and vocabulary skills to 22 eleventh-grade minority high school students and found significant pretest-posttest differences on the Scholastic Aptitude Test and the Nelson-Denny Reading Test. Bereiter and Bird (1985) conducted an experimental study involving eighty students in Grades 7 and 8 and found significant advantages for target strategy acquisition and reading comprehension using a treatment combining think-aloud strategy, modeling, and practices. Baumann, Seifert-Kessell, and Jones (1992) extended the work of Bereiter and Bird (1985) to investigate the effectiveness of explicit think-aloud instruction on elementary students' comprehension monitoring abilities and found positive results. Ward and Traweek (1993) conducted two empirical studies to evaluate the effect of using the think-aloud technique for elementary students during a reading assessment. The first study showed that asking students to give reasons for responses improved performance on a test of reading comprehension. The second study showed that incorporating the think-aloud technique in remedial reading instruction resulted in substantial gains in reading comprehension.

The aforementioned studies seems to suggest the positive effects of think-alouds on reading comprehension. However, these studies were conducted in L1 reading settings. Whether the procedure can facilitate reading in an EFL context or not is still a

topic which awaits exploration. Up to now, only a limited number of studies have provided such information indirectly. For example, Block (1986) used think-alouds to examine the comprehension strategies used by college-level English as a Second Language (ESL) students. In the study, several participants reported that think-alouds were an important learning tool and they learned to read better because of the use of it. Davis and Bistodeaus (1993) study has also provided some incidental empirical evidence on the effect of the procedure. They used data collected from think-aloud protocols to determine how two groups of adult subjects approached reading in their L1 and L2. Besides finding evidence to support the contention that components of the foreign language itself have a powerful impact upon psychological processing during L2, they also found that their subjects had enjoyed performing the think-aloud protocols and felt their L2 reading had improved as a result of participation in the session. Chern (1993) explored the significant role verbal report played in L2 reading comprehension for different proficiency levels of EFL students. It was found that think-alouds facilitated lower EFL proficiency readers' comprehension.

Although positive findings are available in the literature, the small number of studies and lack of direct investigation on the effectiveness of think-alouds for L2 reading have made the drawing of conclusions and instructional implications difficult. To add to the literature and give further insights into this issue, an empirical study was conducted. Specifically, three research questions were posed in the study: (a) Do the reading comprehension scores of a group of EFL students, who have been instructed with the think-aloud procedure, differ significantly from those of the other group who did not

receive the instruction? (b) Does the length of think-aloud instruction affect students' improvement of reading comprehension? (c) What are the possible difficulties EFL students may encounter while using think alouds?

Method

Subjects

Fifty-seven Chinese students enrolled in two Freshman English classes in a university in Taiwan were involved in the study. There were thirty-one students in one class and twenty-six students in the other class. Both groups of students were identified by the university English placement test as high English proficiency level students. The placement test has been used by the university to assign students to different levels of English classes. Students are classified as high, mid, or low based on their knowledge of grammatical structures and listening and reading comprehension abilities. The mean score for Group One students was 73.2 and the standard deviation was .62. Group Two students' mean score was 73.6 with a standard deviation of .63. For the two groups of students' University English Placement Test scores by language skills, please see Table 1. There was no significant difference between the two groups' reading comprehension scores on the University English Placement Test.

Insert Table 1 about here

The students were from various departments in the College of Management and Social Sciences. None of the subjects in either group had been exposed to the think-aloud procedure before the study. The study was conducted in the middle of the semester to

allow students to familiarize themselves with the new university environment and the logistics of the course.

Instrumentation

Two tests which consisted of five multiple-choice and five short-answer questions were used to measure the students' comprehension of the two passages. Two experienced Freshman English teachers were consulted regarding the appropriateness of the tests. A questionnaire was also developed to obtain information on the students ttitudes toward the use of the think-aloud procedure (see Appendix).

Materials

Two passages, labeled passage A and passage B, were selected from the high level Freshman English textbook, *Mosaic I* (Wegmann & Knezevic, 1990). The two passages were of similar length and readability level according to the Bormuth Grade Level. Both passages addressed health issues and neither of them was related to the students' major fields of study.

Procedure

The training of think-aloud procedure, testing of reading comprehension, and collecting of test results and qualitative data occurred within a two-week period. Each class period lasted for one hour. In the first week, Group One students were introduced to the think-aloud procedure before reading passage A. A training session based on the Baumann and Schmitt Explicit Instruction Model (1986) was adopted to familiarize subjects with the think-aloud procedure. The training included: 1) an explicit explanation of the purpose of think-aloud procedure, 2) listening to a prerecorded demonstration tape,

3) teacher modeling of the use of the procedure, 4) guided practices with a short passage, and 5) independent practices. After the training session, Group One students were given ten to twenty minutes to read aloud in class every day for the rest of the first week. To encourage students to verbalize their exact thoughts, the researcher advised the students to feel free to use either L1 (i.e., Chinese) or English to think aloud. At the end of the first week, Group One students were asked to read passage A and take a comprehension test. Group Two students, although not receiving the think-aloud training, were also asked to read passage A and take the same comprehension test.

The second week, Group Two students were given the same kind of think-aloud training and practice that Group One had received earlier. Meanwhile, Group One students continued to use the think-aloud procedure for independent reading during the second week. At the end of the week, both groups were given passage B and a corresponding comprehension test. Afterwards a questionnaire was given to both groups to elicit responses toward the think-aloud training and the use of think-aloud procedure. To avoid being constrained by their limited English language proficiency, the students were allowed to use both Chinese and English to answer the questionnaire. The questionnaire was answered before the students were given their reading comprehension scores of passage A and passage B so that they would not be affected by the test results.

In summary, the data collected for this study consisted of: 1) reading comprehension test scores of passage A for both groups, 2) reading comprehension test scores of passage B for both groups, and 3) responses from the questionnaire. The statistical analyses included: 1) an analysis of covariance on the comprehension scores of

passage A for both groups in which the reading comprehension on the University English Placement Test was partialed out to make sure that any significant difference was not due to initial differences between the groups in comprehension ability, 2) a t-test of Group One mean scores of passage A and passage B, 3) a t-test of Group Two mean scores of passage A and passage B. The analyses of the questionnaire responses focused on the participants' attitude toward the think-aloud procedure, the advantages and disadvantages of using think-alouds to enhance EFL reading comprehension, and the appropriateness of the training session. Students' comments were sorted and categorized.

Findings

Comprehension test results

Table 2 presents the reading comprehension test results of Group One and Group Two on passage A and passage B. Group One's reading comprehension score for passage A was 7.68 and the score for passage B was 8.65. There was a .97 increase of the test score. Group Two's score for the first reading comprehension test was 7.50 and the score for passage B was 8.92. There was a 1.42 increase of the test score. The t-test revealed that both of the increases were statistically significant ($p<.01$).

Insert Table 2 about here

This result demonstrated that for Group One students, after the think-aloud training and one week of practice of the procedure, their reading comprehension score significantly improved. As for Group Two students, the reading comprehension score also improved significantly after the think-aloud training. In other words, one week and two

weeks of think-aloud training both made a significant improvement on the subjects' reading comprehension scores.

Statistical significance was not found between Group One and Group Two's comprehension scores of passage A. This means that although after receiving the think-aloud training, Group One's comprehension score on passage A was slightly higher than Group Two's. The difference, however was not significant.

Responses to the questionnaire

In general, both groups of students responded positively to the use of think-aloud procedure. Forty-four (77%) students believed that the use of the procedure had improved their English reading comprehension ability. Three (5%) responded that the use of the procedure both helped and hindered the comprehension. Four (7%) replied that the procedure neither helped nor hindered the comprehension. Six (11%) students claimed that the use of the procedure interfered with their understanding of the texts. Students responded positively because the method encouraged them to make prediction and helped them to focus on meaning of the text rather than individual words. The following responses are examples of typical reasons for the positive effect:

"It lets me think about the meaning of the words and can guess the meaning of the whole sentence."

"It can make me think more about the meaning."

" I can guess the meaning of new words without looking them up in the dictionary and this saves me a lot of time."

"It encourages me to think and make guesses about the meaning of the texts."

On the other hand, negative responses were due to unfamiliarity of the procedure and the interference with regular reading habits. Some students thought it was time-consuming to use the procedure to read. The following responses exemplified the negative comments:

"It sometimes hinders my reading comprehension because I like to read by thinking without talking out."

"Thinking out loud is distracting. I can not concentrate when I was thinking aloud."

"It takes a lot longer to read."

The three students who stated that the procedure both hindered and helped the comprehension further explained that the procedure helped them to understand the unknown text based on what they had known but it interrupted their train of thought when there were too many unknown words in one sentence. To stop and think out loud the meaning of the words before moving on to the next sentence was frustrating.

Fifty-four (95%) students responded that the procedure made them more aware of their own reading behavior. Three (5%) students stated that because of the short duration of the practice, they had not felt the effect of the procedure. As for the amount of time given to practice the think-aloud procedure, Forty-five (79%) students responded that the think-aloud training and practices were too short. Twelve (21%) students thought that they had enough exposure before taking the quizzes. Among the students who thought that the practice time was not enough, there were approximately equal number of students in either group. Twenty-three students in Group One, who had the two-week practice,

thought the time was too short; whereas twenty-two students in Group Two, who had only one week of training, thought the training was too short. One more week of practice did not seem to make a difference.

When asked if the use of the procedure had helped them to get higher scores in the comprehension tests, twenty-nine (51%) students believed that it had, twenty (35%) students responded that they did not know, and eight (14%) students said that they did not think that the procedure had affected their scores. The students who responded positively answered that they used the think-aloud to guess the correct answer while tackling a difficult question. Students who did not know if the procedure had helped them get a better grade explained that they wouldn't know before they received the test results. Students who thought that think-alouds did not help complained that the exposure to the procedure was not enough to make a difference. A few students commented that the time given for taking the comprehension tests was too short to use think-alouds.

Fifty-two (91%) of the students answered that they considered the procedure a viable tool to help them improve the comprehension of English texts and would continue to use the procedure to read English after the study. Three (5%) remain skeptical and were not sure whether they would use it again or not. Two (4%) answered that they were not comfortable with the use of the procedure and would not consider using it in the future.

Conclusions, Discussions, and Limitations of the Study

Based on the results, several conclusions can be drawn. First, both groups of students reading comprehension scores improved significantly after receiving one and

two-weeks of think-aloud training. Students' perception of the think-aloud procedure, which was obtained from the questionnaire, was consistent with the comprehension test results. The majority of the students who participated in the study felt that the procedure has helped them to better comprehend the English passages and considered the think-aloud procedure an effective means to enhance their English reading ability. This positive finding corroborates the direct evidence provided by L1 think-aloud studies (Baumann, Seifert-Kessell, & Jones, 1992; Bereiter & Bird, 1985; Casanave, 1988; Nist & Kirby, 1986; Ward & Traweek, 1993) and indirect evidence by L2 studies (Block, 1986; Chern, 1993; Davis & Bistodeau, 1993). However, the insignificant difference between the test scores of the two groups is somewhat discomforting because it means that there was no direct link between the one-week training of the think-aloud procedure and comprehension improvement, even though this seems to be demonstrated by the improvement of Group Two. Several possible factors might have contributed to this confusing result. A possible explanation for it could be learner differences. Similar to what Block (1986) and Ward and Traweek (1993) have reported, some students found think-aloud disruptive of the reading continuity. In addition, students' verbal ability might have interfered with their effective use of the procedure. For students who are less verbal, the procedure can impose extra psychological demand on them. In the study, among the six students who responded negatively to the procedure, four of them were in Group One. This difference could have caused the insignificance between the two groups' comprehension score of passage A. After one week of using think-alouds, Group Two students outperformed Group One in the comprehension score of passage B.

Although speculative, it could be an indication that Group Two students responded better than Group One students to the think-aloud tasks.

Second, because of the use of the procedure the participants have become more aware of their own reading behavior. As Block (1986) points out, the task of thinking aloud forces L2 readers' attention on what they understand and what they need to know. By attempting to articulate what they understood, the participants of this study became aware of what they did not understand. Such awareness helped them to see the need to coordinate strategic processes, such as making predictions, searching background knowledge, and seeking clarification (Ward & Traweek, 1993). This awareness of one own reading behavior and the use of comprehension strategies hold an important ramification for L2 readers. The participants of this study were not novice readers. They were university students who had acquired certain reading comprehension strategies that proficient readers have in their L1 reading. However, as L2 readers, they needed to be prompted to regulate their performance. The think-aloud condition, which required them to verbalize their thinking, might have brought out those internalized comprehension monitoring strategies to the conscious level, and thus facilitated the application of reading skills that were available but not used spontaneously in L2 reading. McLaughlin (1990) argues that all learning requires a certain degree of awareness and there is no exception in L2 learning. Think-aloud requirement activates the metacognitive monitoring for self-regulation that has not become automatized in EFL students. In other words, explicit awareness and overt verbalizations of thinki..g process have not only caused deeper

processing of the text but also facilitated the transfer of the existing comprehension strategies from L1 to L2.

Third, the responses to the questionnaire have revealed factors that could affect students' comfort level with the use of think-aloud procedure. The duration of the training was one of them. Neither one nor two-week training was enough to familiarize students with the procedure. Despite the positive effect, many students still felt uncomfortable using think-alouds after one-week or two-week of exposure. In addition to the training time, the difficulty level of the text could have been a confounding factor. Research has shown that tasks requiring students to verbalize their thinking promote more deliberate planning (Ericsson & Simon, 1984). When subjects are simply instructed to verbalize the information they attend to, the structure of the reading process is not changed. When the tasks require the reader to explain the reasons for meaning making from texts, the process moves from a perceptual one to a cognitive one. Verbalized description, thus is helpful with more difficult items that require some search for alternative solutions (Ward & Traweek, 1993). Nevertheless, the subjects in this study pointed out that when the text was too difficult, the procedure did not help but further frustrated them by requiring them to attend to an additional task, i.e., verbalizing thoughts. It seems that there might be a threshold of text difficulty level to reap the full benefits of the think-aloud procedure. Additional research is needed in determining the proximity of the text difficulty for ultimate effectiveness of think-aloud use.

The major complaint the students had regarding the difficulties in using think alouds was the impairment of the reading speed. The result was in congruence with

Breeder and Birds (1985) study report. However, if the students had had more time to practice the procedure and were proficient in think-aloud tasks, the result might have been different.

In addition to the aforementioned precautions while drawing conclusions, several limitations to the study also deserve attention. First of all, the think-aloud procedure is sensitive to instructional variables. Since the procedure has not been standardized (Ward & Traweek 1993), different think-aloud exposure (i.e., different teacher, pacing, explanation, modeling, etc.) might result in different effects. Secondly, text type was one variable which was not controlled by the study. There is a possibility that think-alouds work better for some text types than for others. Future research on the think-aloud with different text types is needed to determine if these results are generalizable. The short duration of the experiment is an limitation, too. If the instruction is extended over a longer period of time, students may be able to assimilate think-alouds into their repertoire of reading strategies more readily (Baumnn, Swifert-Kessell, & Jones, 1992). Nevertheless, significant treatment effects have been reported for experiments having relatively short-term intervention periods (Bereiter & Bird, 1985; Miller, 1985, 1987; Palinscar & Brown, 1984; Schmitt, 1988). Therefore, additional research is needed to draw definite conclusions. Finally, populations with other linguistic and cultural backgrounds are needed to determine if these results are generalizable beyond the scope of the subjects who were employed in this study.

Instructional implications

Despite the limitations of the study, instructional implications can still be found based on the research results. EFL teachers can introduce the think-aloud procedure to their students and make it one of the comprehension strategies available to their students. After introducing the procedure, regular practice can be used to help students to use the technique with greater ease. Students who are not comfortable verbalizing their thinking process can think aloud silently. To make verbalization a natural behavior, learners can talk to each other aloud concerning what they do and do not understand as they read. These paired readers can then share problems, knowledge, and strategic resources. The verbalization of expert readers can serve as a basis for designing teachable reading comprehension strategies. Think-alouds should not be limited to the reading of academic texts, thus an EFL teacher can suggest students try using think-alouds even when they are reading for enjoyment. By doing so, think-alouds can become a comprehension-fostering technique that provides students ample opportunities for sharing, discussing, and reading collaboratively. Finally, since not all students respond well to the procedure, the EFL teacher should allow students sufficient time to experiment with the procedure. Should some students find it not comfortable to use, other alternative ought to be used to help these students with their EFL reading.

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Table 1

Group One and Group Two Students Placement Scores by Language Skills

	Listening	Grammar	Reading	Total
Group 1	M 22.5	M 21.28	M 29.39	M 73.17
n=31	SD 2.86	SD 1.92	SD 2.47	SD .62
Group 2	M 21.24	M 21.50	M 31.51	M 73.66
n=26	SD 3.27	SD 2.54	SD 3.58	SD .63

Table 2

Group One and Group Two Students Reading Comprehension Scores of Passage A and Passage B

	Passage A	Passage B
Group 1	M 7.68	M 8.65
n=31	SD 1.56	SD 1.02
Group 2	M 7.50	M 8.92
n=26	SD 1.50	SD .98

Appendix

Think-Aloud Questionnaire

The followings are questions regarding your experience with the Think-Aloud procedure. Please feel free to give your personal opinions and answer as thoroughly as possible. You can answer them either in English or Chinese, whichever serves the purpose of expressing your thoughts.

1. In general, does the think-aloud procedure help or hinder your reading comprehension?

2. In your opinion, what are the strengths of the think-aloud procedure?

3. In your opinion, what are the weaknesses of the think-aloud procedure?

4. Have you ever used the think-aloud procedure before?

5. Is the think-aloud procedure different from or similar to your usual reading habit? In what ways are they similar/different?

6. Do you think we had enough time to practice the think-aloud technique before taking the quizzes?

7. Do you think the think-aloud makes you more aware of your own reading behavior?

8. Do you think the think-aloud training improves your test score?

9. Will you continue to use the think-aloud procedure to help you read?